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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,592	01/22/2004	Jean-Baptiste Quoirin	S1022.81119US00	3018
23628	7590	06/01/2006	EXAMINER	
WOLF GREENFIELD & SACKS, PC FEDERAL RESERVE PLAZA 600 ATLANTIC AVENUE BOSTON, MA 02210-2206			WARREN, MATTHEW E	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/762,592

Applicant(s)

QUOIRIN ET AL.

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-14, 30-42, 60 and 61 is/are allowed.
- 6) ☒ Claim(s) 15, 17, 18, 43, 46, 47 and 59 is/are rejected.
- 7) ☒ Claim(s) 16, 19-29, 45 and 48-58 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the RCE and Amendment filed on March 9, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Tihanyi (US 6,392,505 B1).

In re claim 15, Tihanyi shows (fig. 2) a MOS- type power component comprising a substrate (1); semiconductor regions (3) extending through the substrate; and contacts (11) extending through the substrate and contacting the semiconductor regions within the substrate.

In re claim 17, Tihanyi shows (fig. 2) an interface (6) between the semiconductor regions (3) is arranged as a plane perpendicular to a surface of the substrate.

Claims 43, 44, 46, and 59 are rejected under 35 U.S.C. 102(e) as being anticipated by Disney (US 6,781,198 B2).

In re claim 43, Disney shows (fig. 1) a MOS-type power component, comprising a substrate having a first main surface (top); and a first region (27a, 27b, 26a, etc) and a second region (21) disposed within the substrate such that the current flows from the first region to the second region throughout substantially an entire thickness of the substrate (because the current flows from the source 27 through the body 26 and down to the drain 31). Current flow in the first region is substantially parallel to the first main surface (because the current flows laterally from the source 27a through the body 26a and under the gate 30a before flowing vertically down through the drift region 22a since the current would not flow through the oxide layer 28a).

In re claim 44, Disney shows (fig. 1) that contacts (insulated field plate regions including 24a and 28a) extend through the substrate, wherein the first region is contacted within the substrate by at least one of the contacts.

In re claim 46, Disney shows (fig. 1) that an interface between the first region and the second region that is arranged as a plane perpendicular to the first main surface.

In re claim 59, Disney shows (fig. 1) that the first region (26a) has a first conductivity type (P) and the second region (21) has a second conductivity type (N).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tihanyi (US 6,392,505 B1) as applied to claim 15 above, and further in view of Stecher.

In re claim 18, Tihanyi shows all of the elements of the claims except the interface arranged as a cylinder. Stecher shows (figs. 1 and 2) a MOS-type power device having the doped components formed in an annular cylindrical shape to form the device having a smaller surface area and ultimately increasing the packing density. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the interface of Tihanyi by forming it as a cylinder as taught by Stecher to form the MOS-type device having a smaller surface area and a larger packing density.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Disney (US 6,781,198 B2) as applied to claim 43 above, and further in view of Stecher.

In re claim 47, Disney shows all of the elements of the claims except the interface arranged as a cylinder. Stecher shows (figs. 1 and 2) a MOS-type power device having the doped components formed in an annular cylindrical shape to form the device having a smaller surface area and ultimately increasing the packing density. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the interface of Disney by forming it as a cylinder as

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taught by Stecher to form the MOS-type device having a smaller surface area and a larger packing density.

Allowable Subject Matter

Claims 1-14, 30-42, 60, and 61 are allowed.

The following is an examiner's statement of reasons for allowance: In re claim 1, the prior art references, alone or in combination, do not show a MOS-type power component in which each of the regions constitutive of the component extend perpendicularly to a surface of a semiconductor chip across an entire thickness thereof. It is understood from the specification that the regions of the component are the source, drain, and intermediary region (channel forming region) of the device. None of the references show that a source, drain, or channel extends across an entire thickness of the substrate.

In re claim 30, the prior art references, alone or in combination, do not show a MOS-type power component in which semiconductor regions extend perpendicularly to a surface of a semiconductor chip across an entire thickness thereof, wherein contacts with the semiconductor regions are made across the entire thickness of the semiconductor chip by conductive fingers. It is understood from the specification that the semiconductor regions are the source, drain, and intermediary region (channel forming region) of the device. None of the references show that a source, drain, or channel extends across an entire thickness of the substrate.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Claims 16, 19-29, 45, and 48-58 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 15-29 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed with respect to claims 43-59 have been fully considered but they are not persuasive. The applicant primarily asserts that Disney does not show all of the elements of the claims, specifically the limitations concerning the current flowing from the first region to the second region throughout an entire thickness of the substrate. The examiner believes that the prior art shows all of the elements of the claims and the limitations in question. As stated in the rejection above, Disney shows in figure 1 that the current flows from the source region (first region) to the drain region (second region). Since the source is formed on the top of the substrate and the drain is formed on the bottom of the substrate, the current flows throughout an entire thickness of the substrate. Therefore, the cited art shows all of the elements of the claims and the rejection is proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew E. Warren


May 30, 2006